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455  
29  
Canada Pacific Works, Ltd.  
Government  
Publications

DEPARTMENT OF PUBLIC WORKS, CANADA.

*Report upon*  
**GEORGIAN BAY SHIP CANAL SURVEY.**

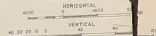
*29*  
**LIST OF PLATES ACCOMPANYING REPORT.** *192*

- PLATE NO. 16—Survey plan, mile 405 to mile 444.  
17—Survey plan, Summit Feeder Canal.  
18—Plan of standard flight of two locks (Nipissing District).  
19—Plan of standard single lock (Nipissing District).  
19a—Plan of standard lock (Ottawa District).  
20—Plan showing lake freight steamer in standard lock.  
21—Plan of stop-log regulating sluices.  
21a—Plan of stop-log hoisting machine.  
22, 22 A. B. C. D. E—Plans of electrical operating and lighting system.  
23—Plan of Verdun regulating culverts.  
24—Plan of regulating Stoney sluices at Deux Rivières.  
25—Daily discharge of the Ottawa River at Besserer's Grove for 1846, 1876, 1881, 1887, 1890, 1904, 1905 and 1906.  
26—Daily discharge of the Ottawa River at Montreal, Besserer's Grove, Gower Point and Deux Rivières.  
27—Flow over weirs.  
28—Daily discharge of the Amable du Fond River, together with the daily fluctuation of Kioshkoqui, Manitou, Tea and Three Miles Lakes, and the daily precipitation in inches at Kioshkoqui Lake.  
29—Daily discharge in flow and the rainfall at Lake Talon, also the fluctuation of Tributary Lakes, and the rainfall in inches on the Watershed.  
30—Daily discharge of the Ottawa River at Besserer's Grove from 1844 to 1846, and 1850 to 1906; also the monthly precipitation and the mean monthly temperature from 1866 to 1906.  
31—Map of Summit and Amable du Fond Watersheds showing proposed diversion into Feeder Canal.  
32—Diagram and Plan of Upper Lock Gates.  
33—Diagram and Plan of Lower Lock Gates.
- 25*  
*la r*



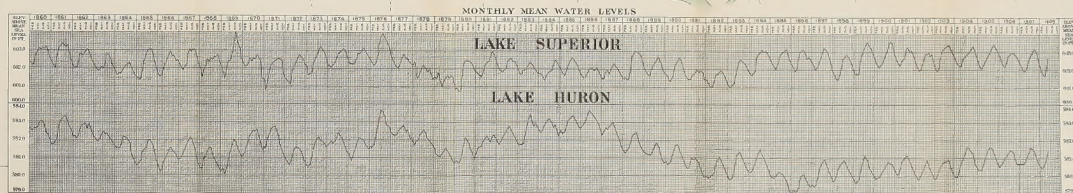
22 Foot Channel Project  
MILE 405 TO GEORGIAN BAY  
1908

### Scales of Feet

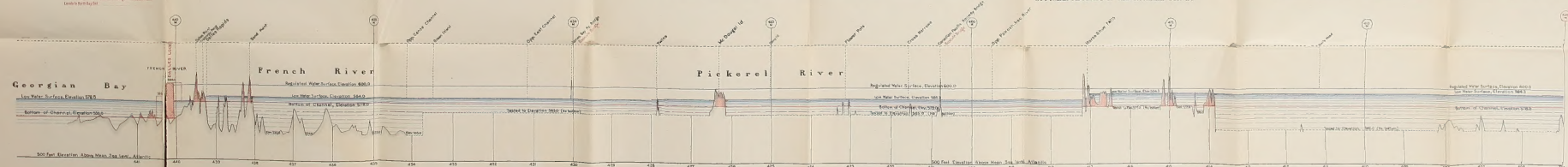


To accompany report upon survey with plans and estimate for a navigable waterway 22 feet deep from San Bay to Wardsville.

A. ST. LAURENT, A. M. C. E. E.,  
District Engineer  
D. R. SCUMLE, C. E.,  
S. J. CHAPLEW, A. M. C. E. E.,  
District Engineers

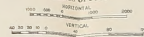


OFFICIAL RECORDS OF THE U.S. LAKE SURVEY



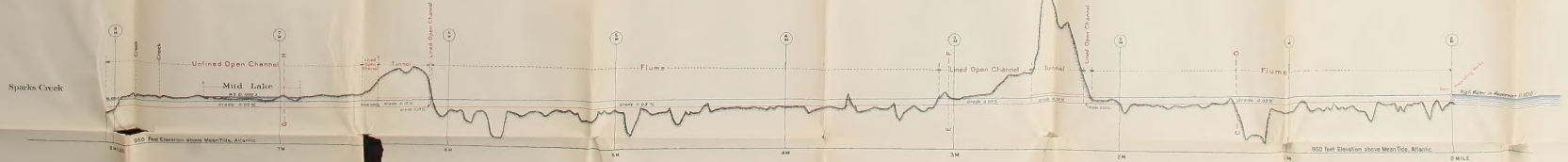
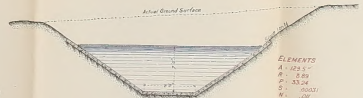
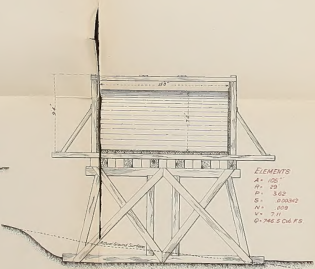
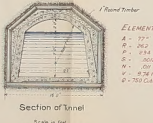
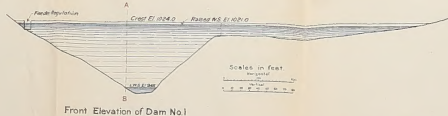
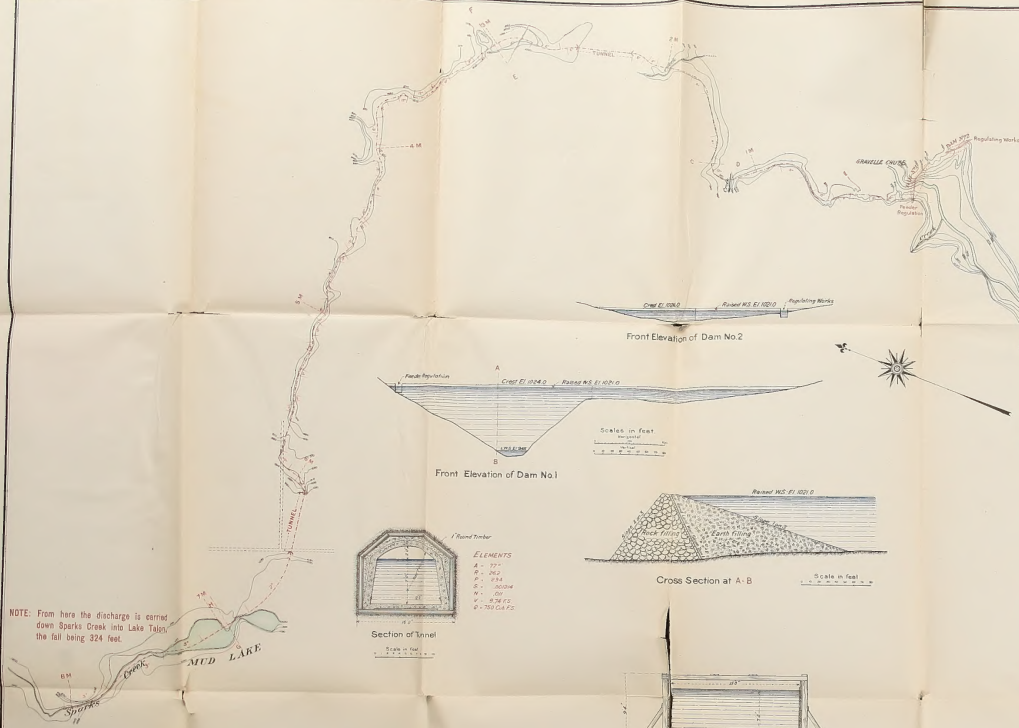
Public Works Canada  
**Georgian Bay Ship Canal**  
 LAKE HURON TO MONTREAL  
 22 Foot Channel Project  
 SUMMIT FEEDER CANAL  
 1908

Scales of Feet



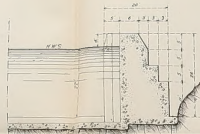
To accompany representation with lines and ordinates of the complete waterway of the Georgian Bay to Montreal.

- 1. Lateral
- 2. Longitudinal
- 3. Transverse
- 4. Vertical
- 5. Plan
- 6. Profile
- 7. Section
- 8. Flume
- 9. Tunnel
- 10. Dam
- 11. Lock
- 12. Weir
- 13. Culvert
- 14. Bridge
- 15. Road
- 16. Railway
- 17. Waterway
- 18. Shoreline
- 19. Contour
- 20. Elevation

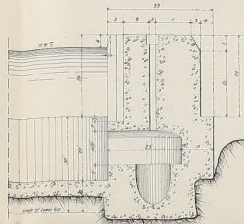




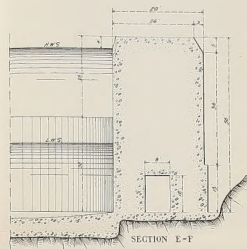
PUBLIC WORKS CANADA  
GEORGIAN BAY SHIP CANAL  
**STANDARD LOCKS IN FLIGHT**  
NIPISSING DISTRICT



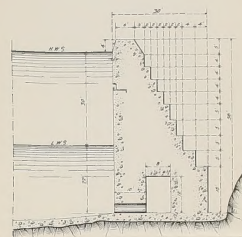
SECTION A-B



SECTION C-D

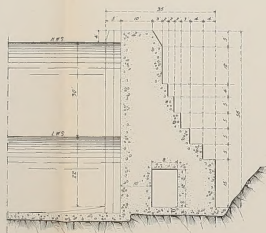


SECTION E-F

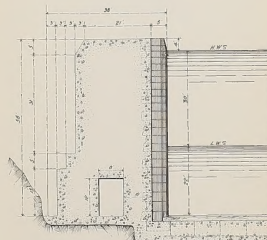


SECTION G-H

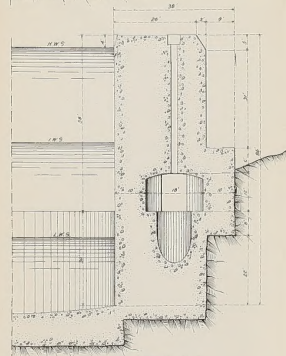
0 10 20 30 40 50 60  
SCALE OF FEET



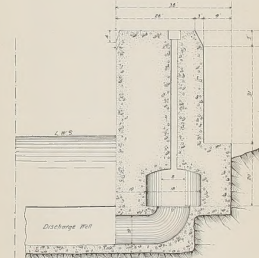
SECTION I-J



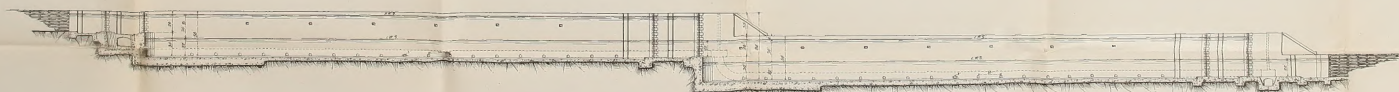
SECTION K-L  
*looking down lock*



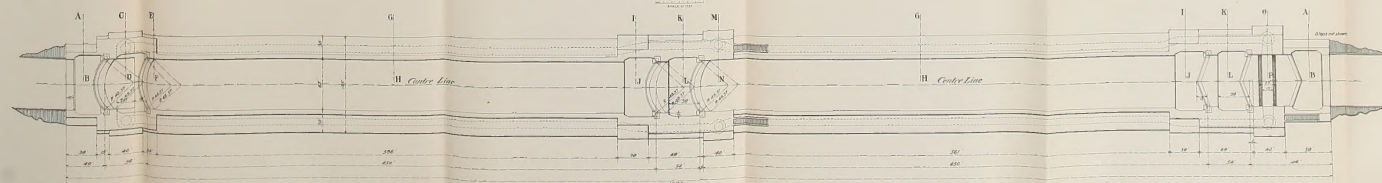
SECTION M-N



SECTION O-P



SECTIONAL ELEVATION  
*Through Centre Line*

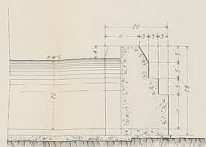


PLAN

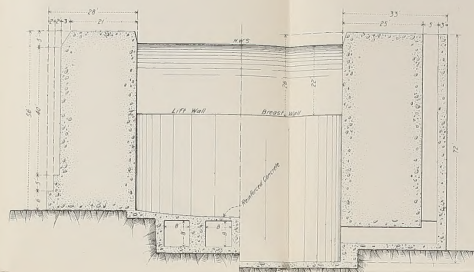
PUBLIC WORKS CANADA  
 GEORGIAN BAY SHIP CANAL  
**STANDARD SINGLE LOCK**  
 NIPISSING DISTRICT

SCALES IN FEET

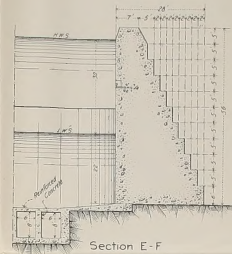
FOR PLAN & ELEVATION  
 1" = 40' 0"  
 FOR SECTIONS  
 1" = 10' 0"



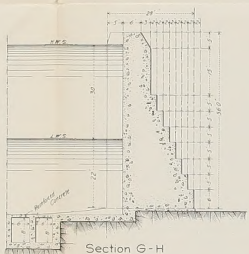
Section A-B



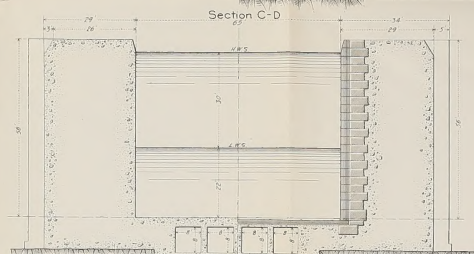
Section C-D



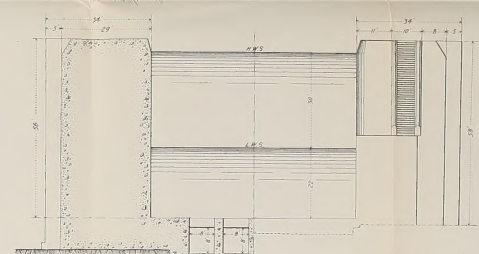
Section E-F



Section G-H



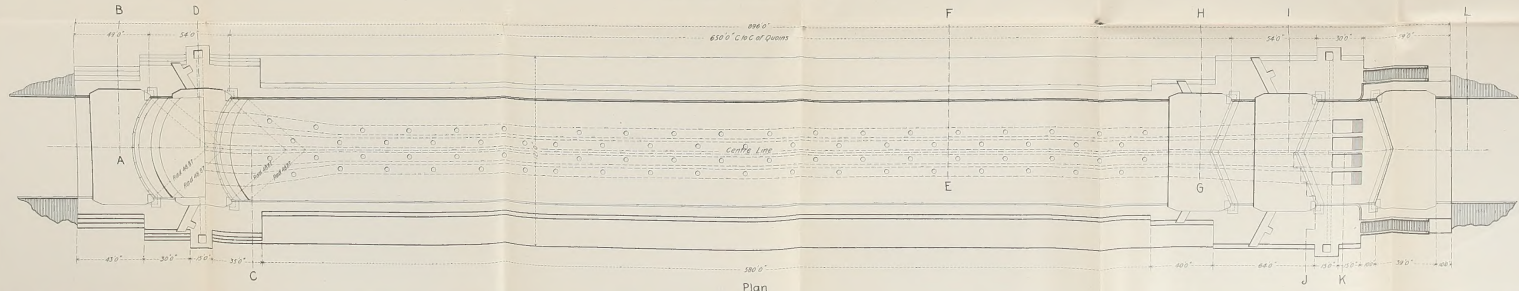
Section I-J



Section K-L



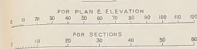
Sectional Elevation on C-L



Plan



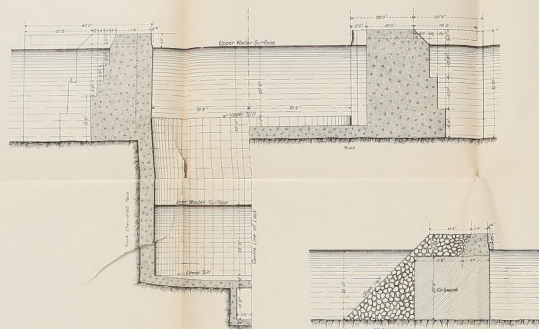
SCALES IN FEET



PUBLIC WORKS CANADA  
GEORGIAN BAY SHIP CANAL  
STANDARD SINGLE LOCK  
OTTAWA DISTRICT

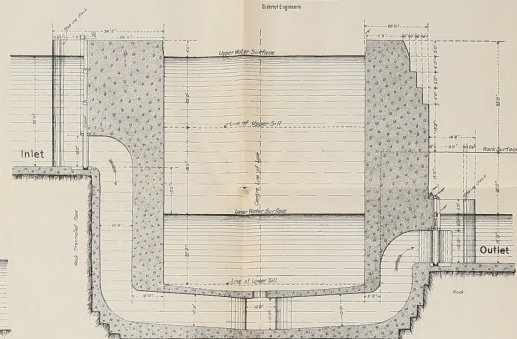
To accompany 1911 open survey with plans and estimates of cost for a navigable waterway 22 feet deep from Georgian Bay to Montreal.

A. S. LAURENCE, A.M. Inst. C.E.  
Engineer in Charge  
D. B. CHAPMAN, A.M. Inst. C.E.  
S. J. CHAPMAN, A.M. Inst. C.E.  
Survey Engineers



Section A-B

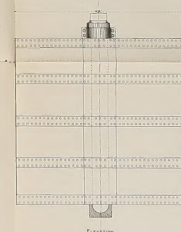
Section through Entrance Piers



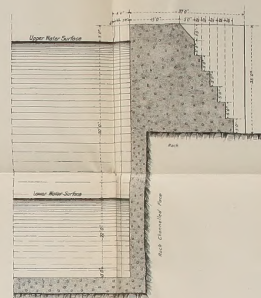
Section C-D



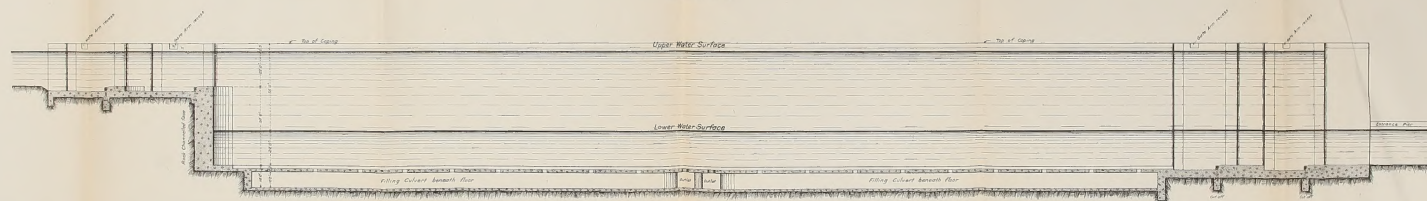
Section A-B



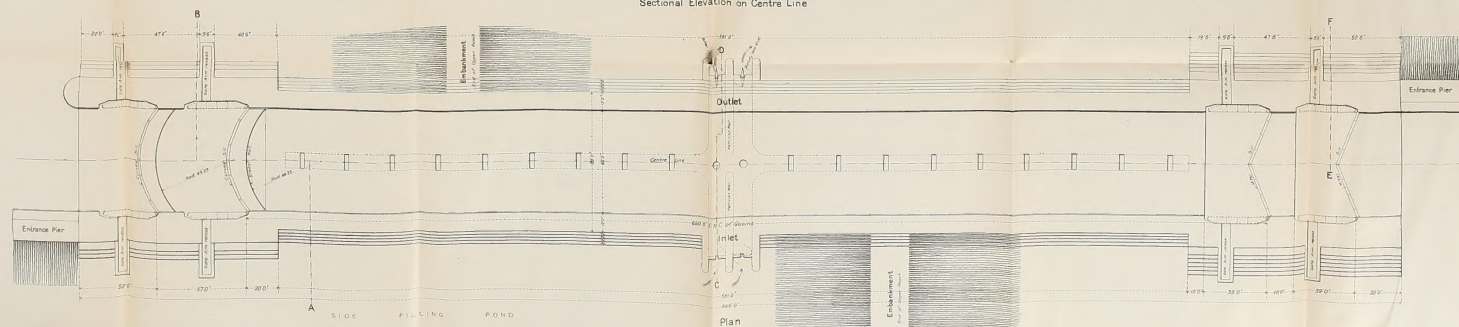
Elevation



Section E-F



Sectional Elevation on Centre Line



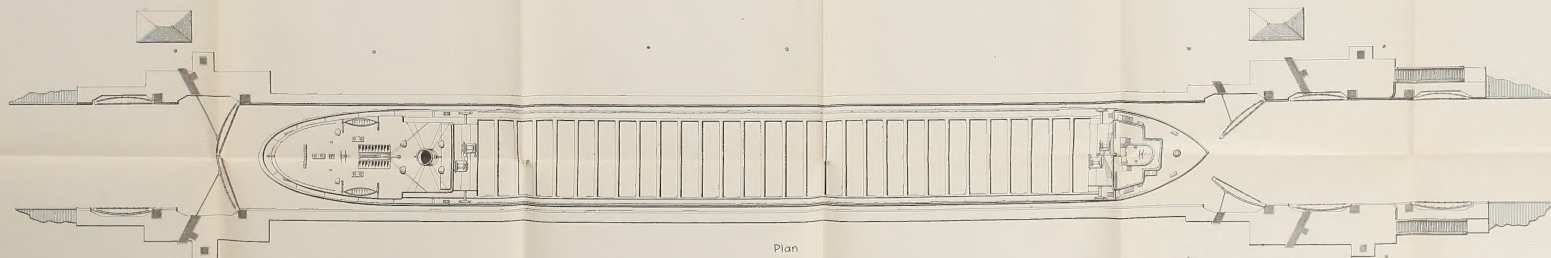
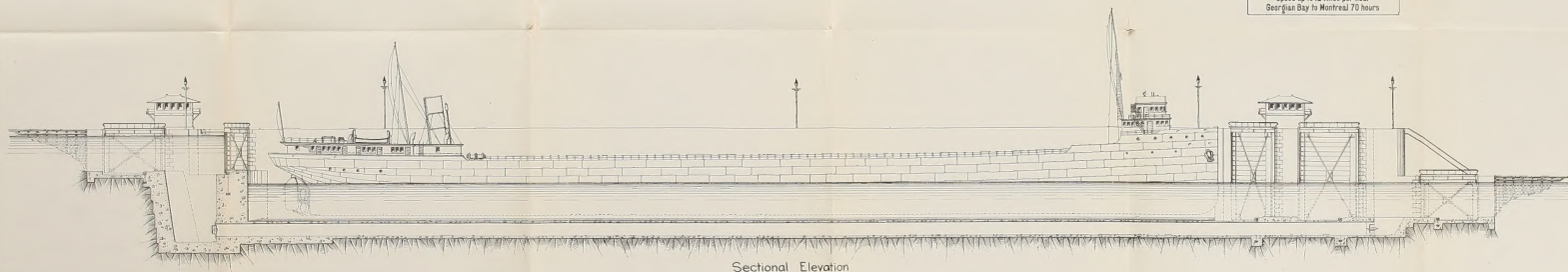
Plan

SIDE FILLING POND

PUBLIC WORKS CANADA  
GEORGIAN BAY SHIP CANAL  
PLAN SHOWING  
MODERN TYPE OF LAKE FREIGHT STEAMER  
IN  
PROPOSED STANDARD CANAL LOCK

SCALE IN FEET

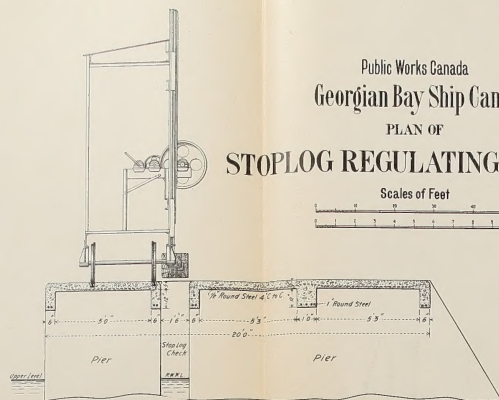
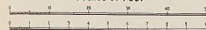
DESCRIPTION OF FREIGHT STEAMER  
Length 600 Feet, Beam 80 Feet, Draft 20 Feet  
Capacity 12000 Tons  
400000 Bushels of Wheat  
equivalent to  
400 cars of 80000 lbs. capacity each  
or  
10 Trains of 40 cars each  
Speed up to 12 Miles per hour  
Georgian Bay to Montreal 70 hours



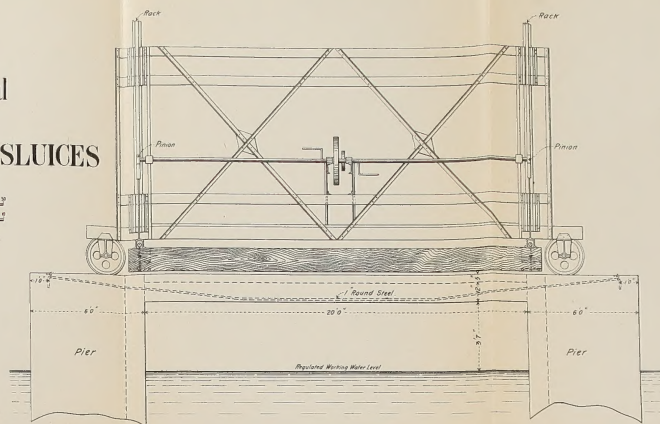


Public Works Canada  
 Georgian Bay Ship Canal  
 PLAN OF  
 STOPLOG REGULATING SLUICES

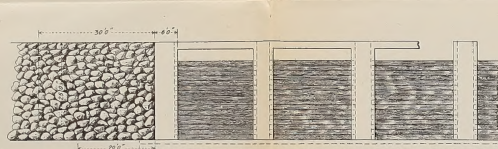
Scales of Feet



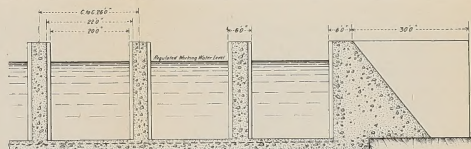
Section K-L



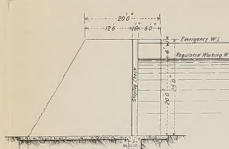
Downstream Elevation  
 Showing flooring of Reinforced Concrete



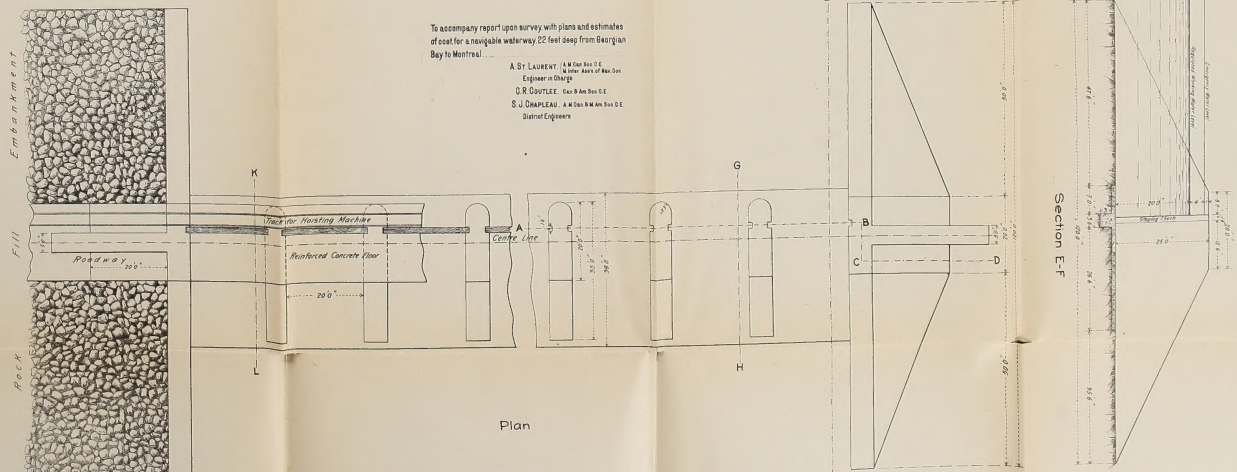
Downstream Elevation



Section A-B-C-D



Section G-H



Plan

To accompany report upon survey with plans and estimates of cost for a navigable waterway 22 feet deep from Georgian Bay to Montreal.

A. ST. LAURENT, A. M. I. C. E.,  
 Engineer in Charge  
 O. R. GUYLER, A. M. I. C. E.,  
 S. J. CHAPMAN, A. M. I. C. E.,  
 District Engineers



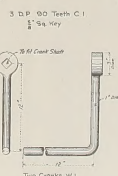
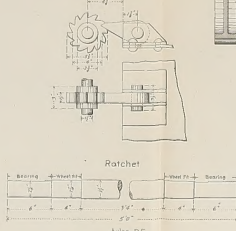
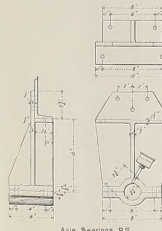
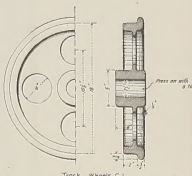
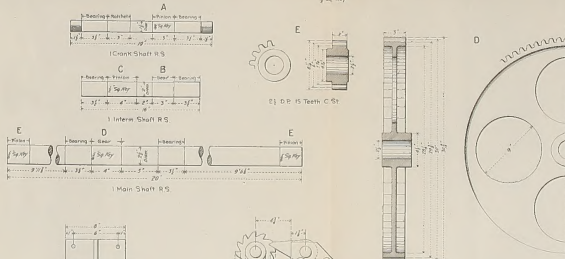
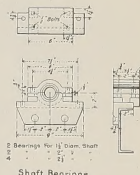
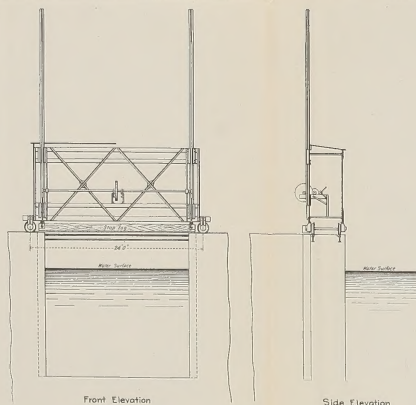
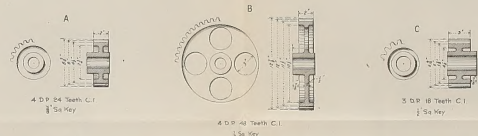
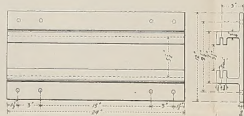
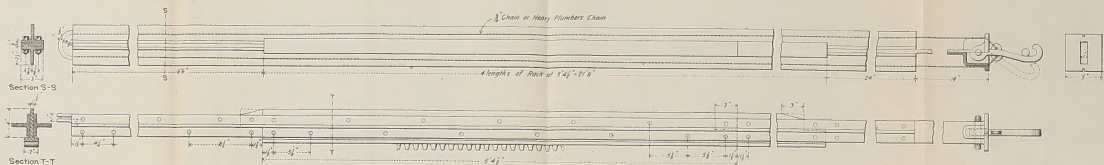
DESIGNED BY  
H. L. MAYOCCA, C.E.

SEVERAL EDITIONS OF  
A. ST. LAURENT, A. ST. LAURENT, C.E.  
DESIGNED BY  
B. D. DUFFLE, C.E. & W. H. BOW, C.E.  
B. D. CHAPLEAU, A. ST. LAURENT, C.E. & W. H. BOW, C.E.  
DESIGNED BY

PUBLIC WORKS CANADA  
GEORGIAN BAY SHIP CANAL

DETAILS OF  
MACHINE FOR OPERATING STOPLOGS

SCALE IN FEET

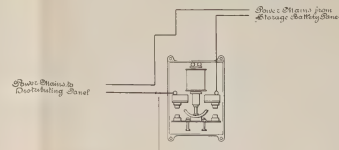
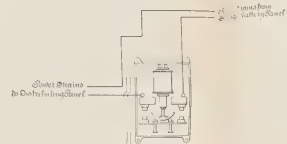




Public Works Canada  
 Georgian Bay Ship Canal  
 Standard Single Lock Ship Lifting District  
 General Diagram of Interlocking Circuits  
 Lighting and Motor Feeders not shown  
 To accompany report of George F. Shiom, Electrical Engineer  
 Ottawa March 15th 1907

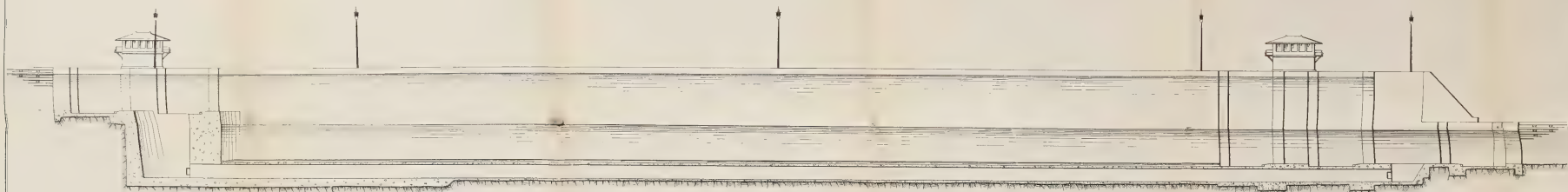
A. H. Vincent, Engineer in Charge. E. J. Chapman, District Engineer.

Scale of feet.  
 0 50 100

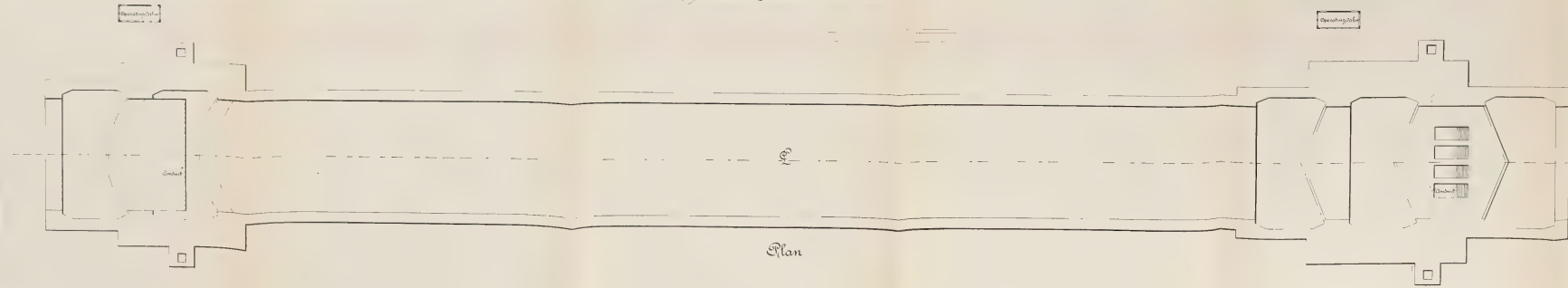


Control panels for interlocking mechanisms on  
 both sides of the lock.

Control panels of interlocking  
 mechanism on both sides of the lock.



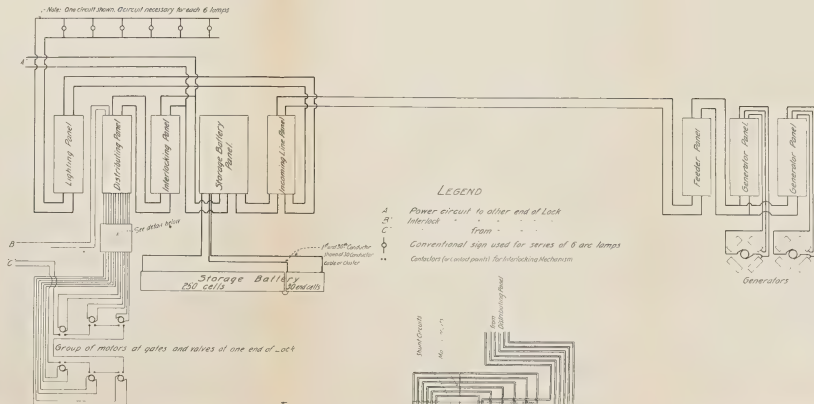
Sectional Elevation on Centre Line



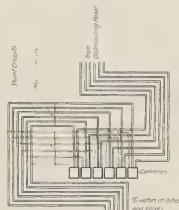
Plan







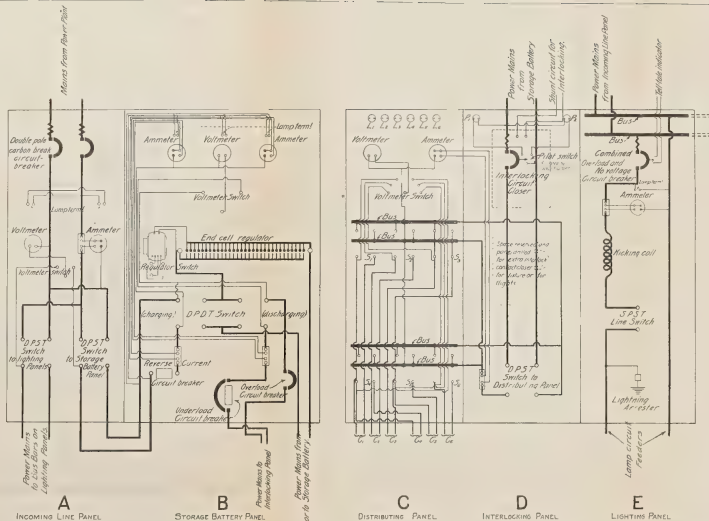
A. St. Laurent  
Engineer in Charge  
S. J. Chapleau  
District Engineer



Detail of Controllers

D. P. W. CANADA  
GEORGIAN BAY SHIP CANAL  
SKETCH OF  
DIAGRAM OF CIRCUITS  
TO ACCOMPANY REPORT OF  
GEORGE F. CHISM  
ELECTRICAL ENGINEER  
OTTAWA MARCH 12, 1907





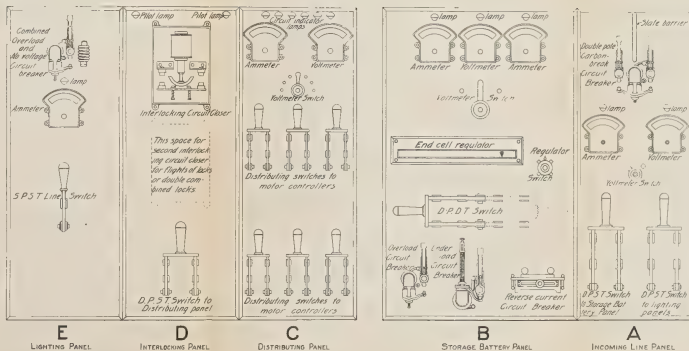
A. St. Laurent  
Engineer in Charge  
S. J. Chapeau  
District Engineer

**LEGEND.**

Double pole,	single throw
" "	double
Single " "	single

etc Lamps indicating when gates or valves are closed.  
etc Circuits leading to controllers  
Lamp indicating when interlocking circuit is closed (white)  
" " " " open (red)

*D.P.W. CANADA  
GEORGIAN BAY SHIP CANAL  
SKETCH OF  
CONNECTIONS OF SWITCHBOARD  
TO ACCOMPANY REPORT OF  
GEORGE F. CHISM  
ELECTRICAL ENGINEER  
OTAWA MARCH 15 1917*

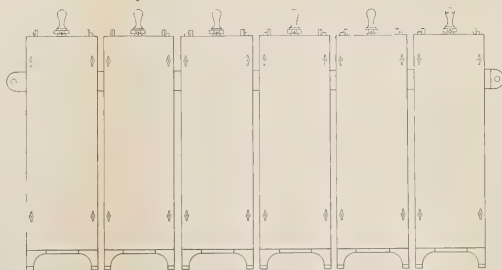


A St Laurent  
Engineer in Charge  
S J Chapleau  
District Engineer

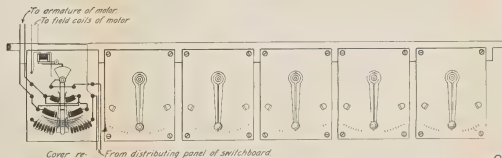
D.P.W. CANADA  
GEORGIAN BAY SHIP CANAL  
SKETCH OF  
ASSEMBLY OF SWITCHBOARD

TO ACCOMPANY REPORT OF  
GEORGE F CHISM  
ELECTRICAL ENGINEER  
OTTAWA MARCH 1917





ELEVATION



Cover re-  
moved to show  
arrangement of  
contacts for re-  
versing motor.  
Full speed in  
either direction

From distributing panel of switchboard.

PLAN

A. St. Laurent

Engineer in Charge

S. J. Chapleau

District Engineer

D.P.W. CANADA  
GEORGIAN BAY SHIP CANAL  
SKETCH OF  
ASSEMBLY OF CONTROLLERS

TO ACCOMPANY REPORT OF

GEORGE F. CHISM

ELECTRICAL ENGINEER

Ottawa March 15, 1907

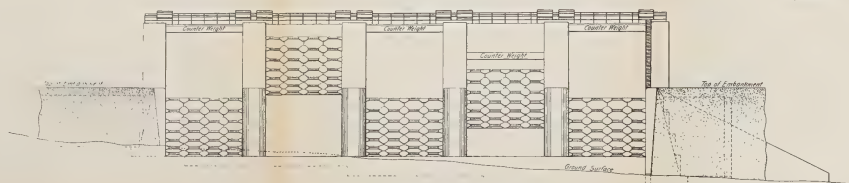




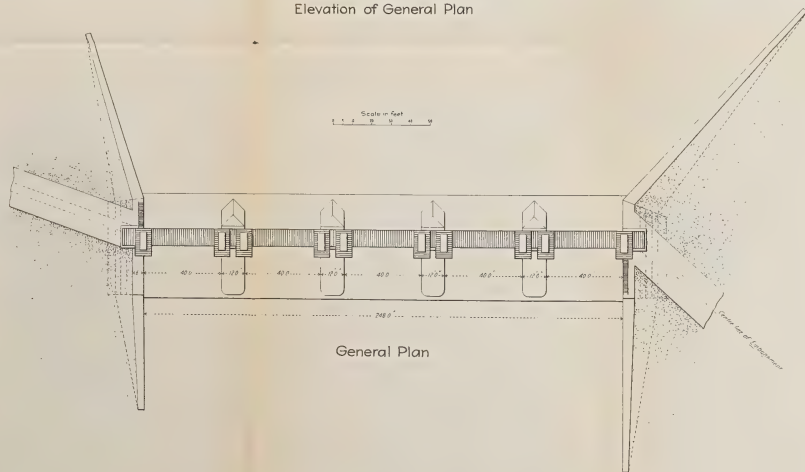
PUBLIC WORKS CANADA  
GEORGIAN BAY SHIP CANAL  
**REGULATING STONEY SLUICES**  
AT DEUX RIVIERES

To accompany report upon survey with plans and estimates  
of cost for a navigable waterway 22 feet deep from Georgian  
Bay to Montreal

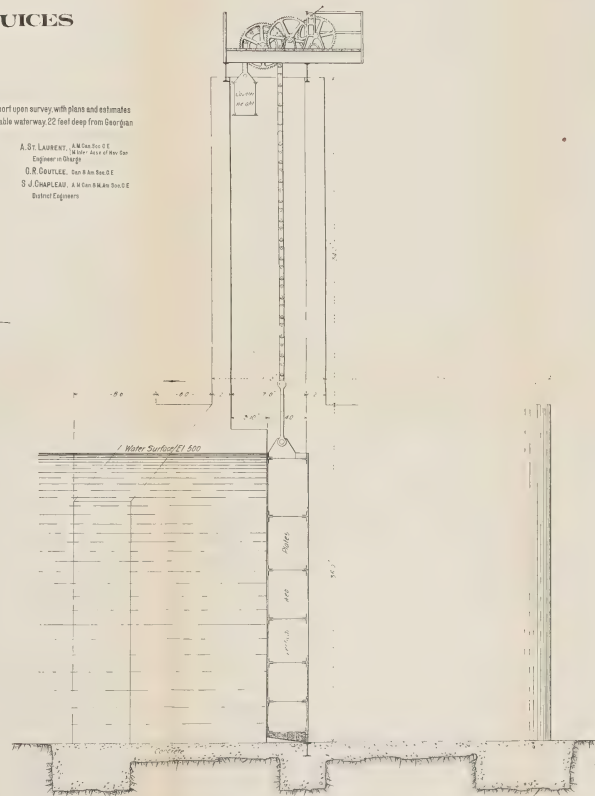
A. ST. LAURENT, A.M. Inst. Civ. E.  
District Engineer in Charge  
D. R. ROUTLEY, Esq. & Son, Inst. C.E.  
S. J. CHAPLEMAN, A.M. Inst. M. Am. Soc. C.E.  
District Engineers



Elevation of General Plan



General Plan

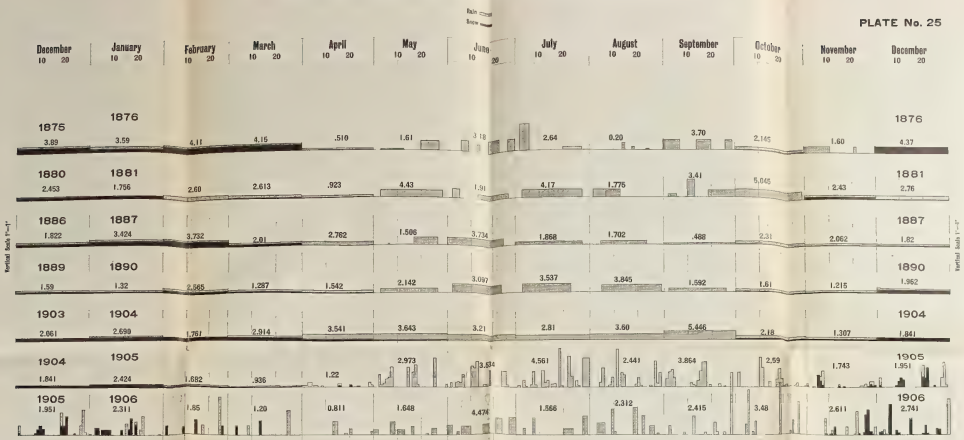


Side Elevation of Pier

Scale in feet  
1 2 3 4 5 6 7 8 9 10

PRECIPITATION FROM DECEMBER TO DECEMBER  
1875 to 1876, 1880 to 1881, 1886 to 1887, 1889 to 1890, 1903 to 1906.

PLATE No. 25

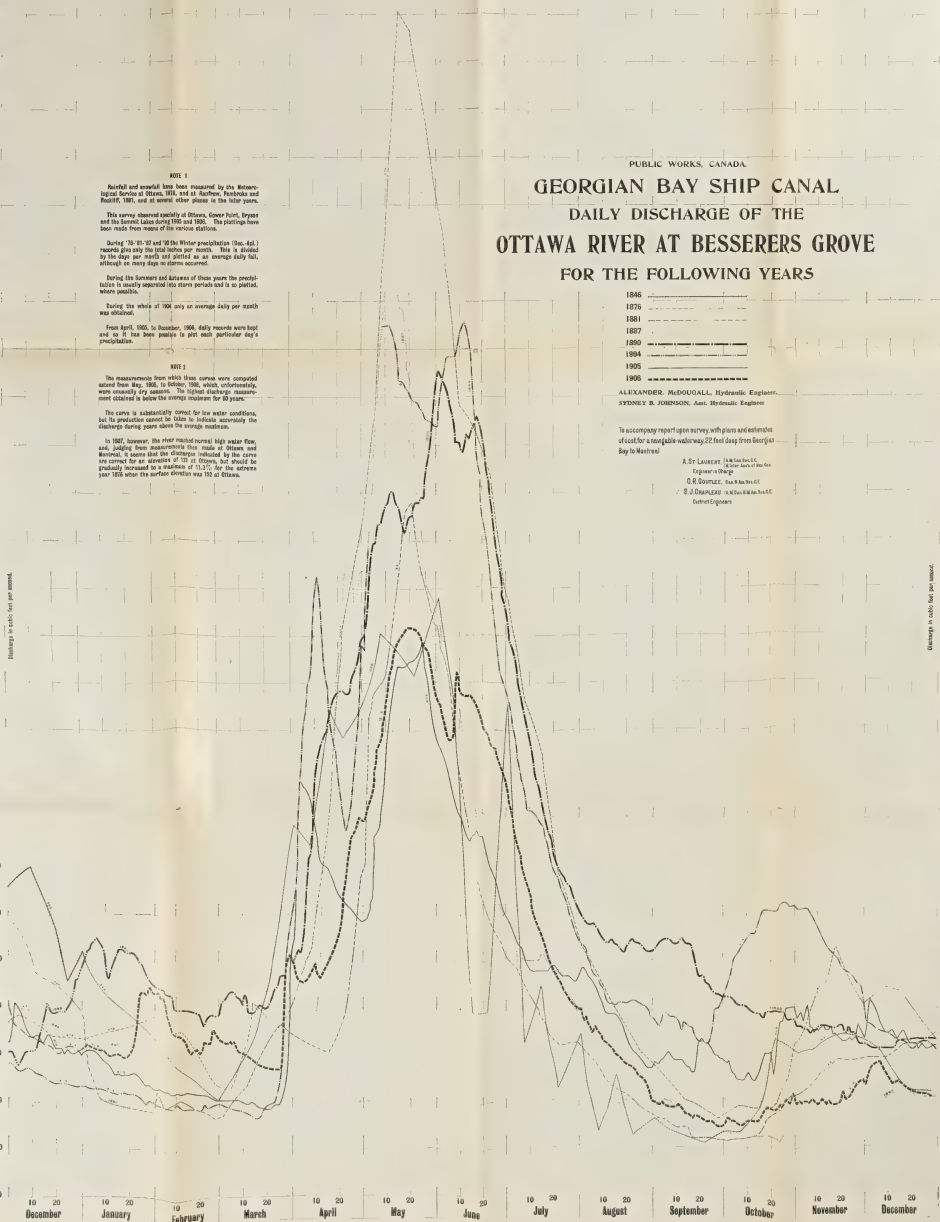


PUBLIC WORKS, CANADA.  
**GEORGIAN BAY SHIP CANAL**  
DAILY DISCHARGE OF THE  
**OTTAWA RIVER AT BESSERERS GROVE**  
FOR THE FOLLOWING YEARS

1886  
1875  
1881  
1887  
1880  
1894  
1895  
1896  
ALEXANDER McDONALD, Hydraulic Engineer.  
SYDNEY R. JOHNSON, Asst. Hydraulic Engineer.

To accompany report upon survey with plans and extension of outlet for a navigable waterway 22 feet deep from Deseronto Bay to Montreal.

A. ST. LAURENT, Hydraulic Engineer, Montreal.  
O. R. GOSSEL, Hydraulic Engineer, Deseronto.  
S. J. CAMPBELL, Hydraulic Engineer, Deseronto.





1904 1905 1906  
 October November December January February March April May June July August September October November December  
 1904 1905 1906  
 October November December January February March April May June July August September October November December  
 1904 1905 1906

PUBLIC WORKS, CANADA.  
**GEORGIAN BAY SHIP CANAL**  
**DAILY DISCHARGE**  
 OF THE  
**OTTAWA RIVER**  
 AT  
 HEAD OF MONTREAL ISLAND, BESSERERS GROVE,  
 GOWER POINT AND DEUX RIVIERES.

Scale 1 Box 1" = 24 Days.  
 1 Year = 365 Days.

TOTAL DRAINAGE AREAS.  
 To Head of Montreal Island, 5593 Square Miles.  
 " Besseres Grove, 4575 " "  
 " Gower Point, 2790 " "  
 " Deux Rivières, 1980 " "

ALEX. HENDERSON, Hydraulic Engineer.  
 VICTOR B. JORDAN, Asst. Hydraulic Engineer.

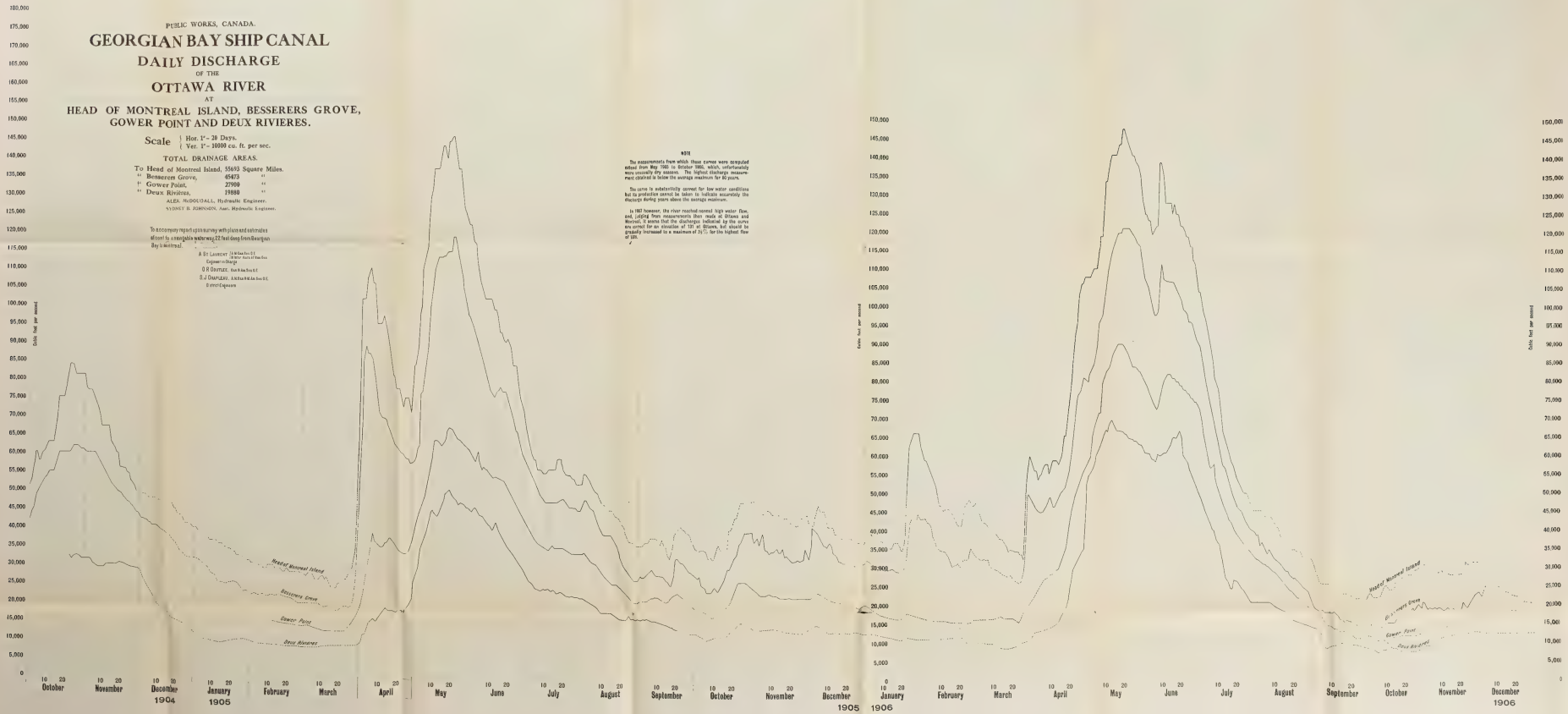
To ascertain the discharge of the river at the several points mentioned above, a series of gauging stations were established at the following places:

A. St. Lawrence, 1884-1885  
 B. Besseres Grove, 1884-1885  
 C. Gower Point, 1884-1885  
 D. Deux Rivières, 1884-1885

NOTE  
 The measurements from which these curves were prepared extend from May 1904 to October 1905, which, unfortunately, were somewhat irregular. The highest discharge measured occurred in June 1905, the average discharge for the year.

The curve is substantially correct for the water conditions but is probably somewhat in excess to indicate accurately the discharge during periods of the normal maximum.

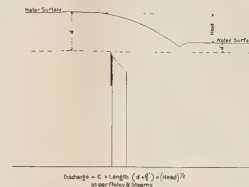
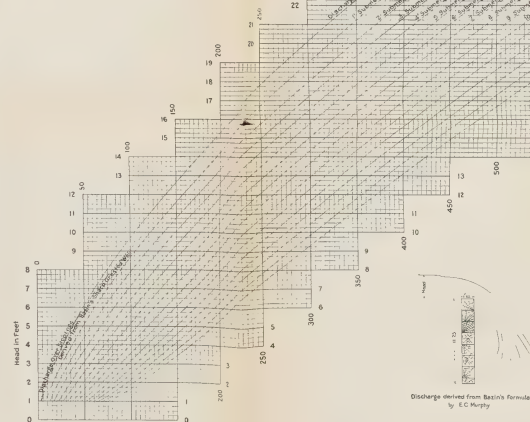
In 1905 however, the river reached several high water flows, and during these measurements the gauging stations at Besseres Grove and Gower Point were not in operation. The discharge indicated by the curve at these points is therefore an estimate, based on the discharge at the head of the river, and is probably in excess to a maximum of 25% for the highest flow of the year.



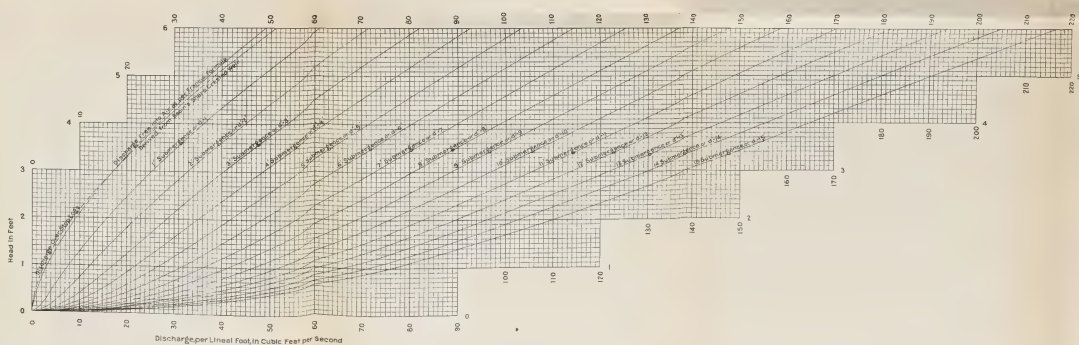


Discharge =  $3.33 (\text{Length}) (\text{Head})^{3/2}$  as per Francis Formula

Discharge =  $(0.405 + 0.39H) \times (1 + 0.55 \sqrt{\frac{H}{1 + 0.55H}}) \times (L \times H^{3/2})$  as per Bazin's Formula



Discharge =  $C \times \text{Length} (\text{Head})^{3/2}$  as per Francis Formula

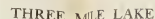


## Public Works, Canada. Georgian Bay Ship Canal Flow Over Weirs

To accompany report upon survey with plans and estimates of cost for a navigable waterway 22 feet deep from Georgian Bay to Montreal.

A. ST. LAURENT, J.B. Mac Donnell  
Engineers in Charge  
D.R. DOUTLÉE, Civil Engineer  
S.J. CHAPLEAU, A. Mac Donnell  
District Engineers





10 ft. Storage	512,982,560	Cubic feet.
20 ft. "	1,024,925,120	" "
30 ft. "	1,538,887,680	" "

TEA LAKE

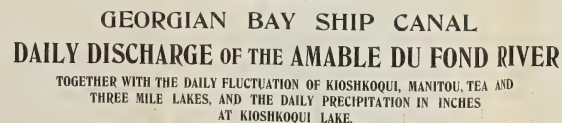
10 ft. Storage	1,625,310,720	Cubic feet.
20 ft. "	3,250,621,440	" "
30 ft. "	4,875,932,160	" "

## MANITOU LAKE

10 ft. Storage	1,398	20,000	Cubic feet.
20 ft. "	2,787	40,000	" "
30 ft. "	4,181	60,000	" "

## KIOSHKOQUI LAKE

10 ft. Storage	986,895,360	Cubic feet.
20 ft. "	1,073,790,720	" "
30 ft. "	2,860,686,080	" "



ALEX. McDOUGALL, Hydraulic Engineer.  
 SYDNEY B. JOHNSON, Asst. Hydraulic Engineer.

To accompany report upon survey, with plans and estimates of cost for a navigable waterway 22 feet deep from Georgian Bay to Montreal.

A. ST. LAURENT, A. W. Geo. Soc. G. E.  
 Engineer in Charge  
 D. R. COUTLEE, Can. & Am. Soc. G. E.  
 S. J. CHAPLEAU, A. M. Can. & M. Am. Soc. G. E.  
 District Engineers

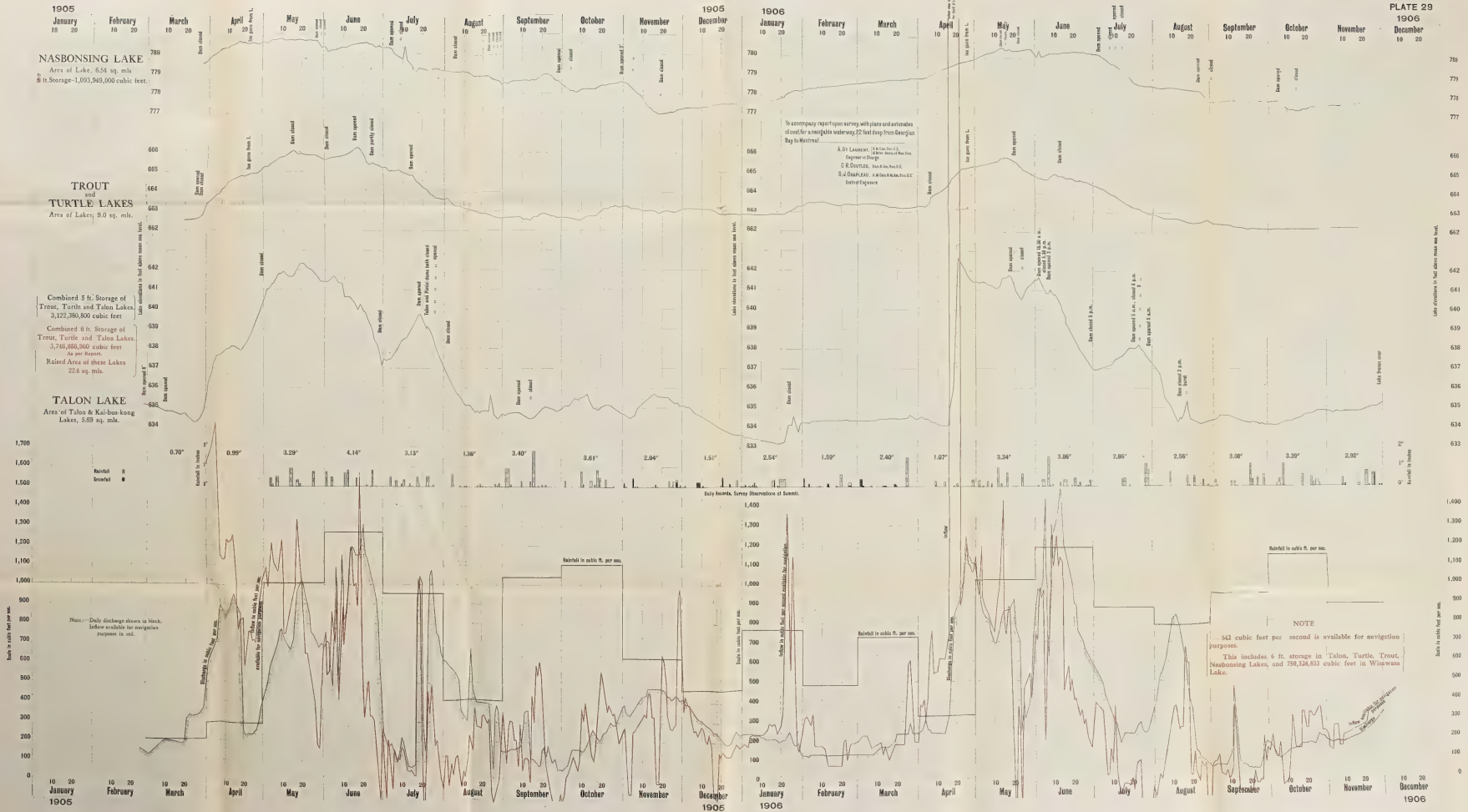
Note: - 1

Discharge approximate from May 1st to June 6th, 1905.  
Lakes Three Mile, Tea and Manitou observations start  
on September 12th, and Kioskoqui on September 3rd, 1905.  
Rainfall observations at Kioskoqui Lake commence  
on October 1st, 1905.

Note—2

735 cubic feet per sec. is the available flow during 200 days of navigation, with 30 foot storage in the reservoirs.

ALEX. McDOUGALL, Hydraulic Engineer.  
 SYDNEY B. JOHNSON, Asst. Hydraulic Engineer.





Public Works, Canada.  
**Georgian Bay Ship Canal**  
 Daily Discharge of the Ottawa River  
 at  
**BESSERERS GROVE**

PLATE N930

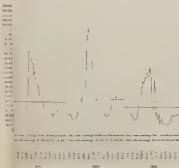
From  
 1844 to 1846, 1850 to 1906  
 and the  
 Monthly Precipitation  
 and the  
 Mean Monthly Temperature  
 from  
 1858 to 1906

Scale  
 1 in. = 1000 ft.  
 Daily Discharge, 1 in. = 1000 cfs.  
 Precipitation, 1 in. = 1 inch.  
 Temperature, 1 in. = 10 Degrees F.

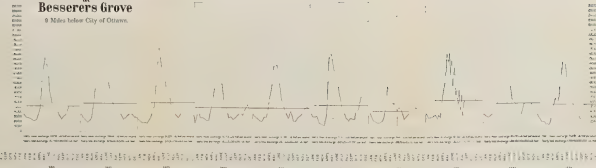
ALEXANDER MCKENZIE, Hydraulic Engineer.  
 BYRON C. B. JOHNSON, Asst. Hydraulic Engineer.

Notes  
 Red line shows yearly mean discharge.  
 Yearly mean discharge from 1844 to 1846 and from 1850 to 1906 - 55,454 cu. ft. per sec.  
 The greatest discharge was in 1850 when it averaged for the whole year 60,000 cu. ft. per sec. The lowest discharge was in 1877 when it averaged 50,825 cu. ft. per second.  
 Yearly mean precipitation from 1858 to 1872 and from 1874 to 1906 - 31.68 inches.  
 Yearly mean temperature from 1858 to 1872 and from 1874 to 1906 - 49.34 Fahrenheit.  
 Run-off was calculated from Dec. 1844 to Dec. 1872 and from Dec. 1874 to Dec. 1906. For these years the average runoff equals 5.3 inches precipitation.  
 Mean maximum high water - 68,800 cu. ft. per second for 60 years.

To accompany report upon survey with plans and estimates of cost for a navigable waterway 22 feet deep from Georgian Bay to Montreal.  
 A. B. LEONARD, (Landscape Architect)  
 GEORGE W. B. LEONARD, (Landscape Architect)  
 G. W. B. LEONARD, (Landscape Architect)  
 G. W. B. LEONARD, (Landscape Architect)



**Daily Discharge of the Ottawa River**  
 at  
**Besserers Grove**  
 9 Miles below City of Ottawa.



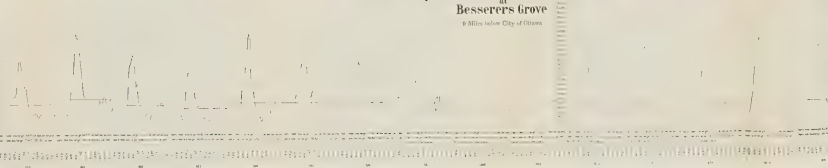
**Mean Monthly Temperature**

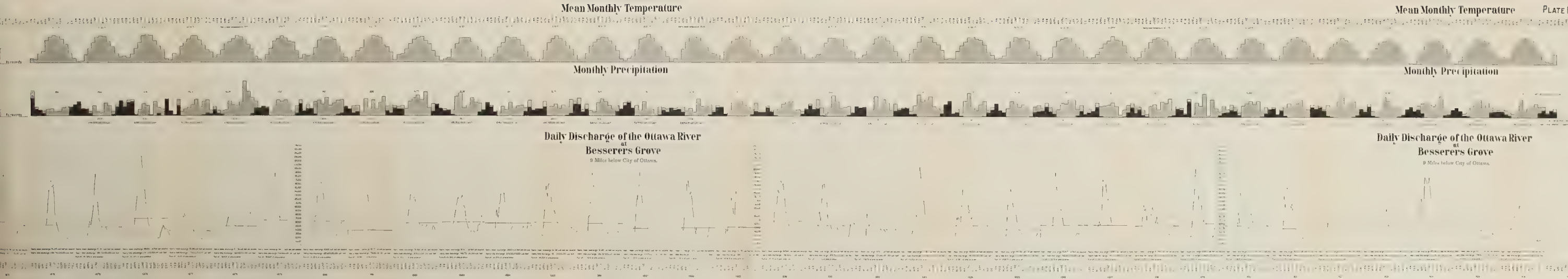


**Monthly Precipitation**



**Daily Discharge of the Ottawa River**  
 at  
**Besserers Grove**  
 9 Miles below City of Ottawa.





Public Works Canada.

# Georgian Bay Ship Canal

## Daily Discharge of the Ottawa River

at  
**BESSERERS GROVE**  
from  
1844 to 1848 & 1850 to 1908  
as follows

### Monthly Precipitation and the Mean Monthly Temperature

from  
1848 to 1908  
as follows

For Dis.	Month
Daily Discharge	Var 1000 cub ft
Precipitation	Var 1 inch
Temperature	Var 10 Degrees F

ALEXANDER W. DOUGLAS, Hydraulic Engineer  
 SYDNEY B. JOHNSON, Asst. Hydraulic Engineer

Notes

Red line shows yearly mean discharge  
 Yearly mean discharge from 1844 to 1848 and from 1850 to 1908 = 55,464 cub. ft. per sec.  
 The greatest discharge was in 1850 when it averaged for the whole year 80,584 cub. ft. per sec.  
 The lowest discharge was in 1877 averaging 35,553 cub. ft. per second.  
 Yearly mean precipitation from 1856 to 1872 and from 1874 to 1908 = 31.68 inches.  
 Yearly mean Temperature from 1856 to 1872 and from 1874 to 1908 = 40.38 Fahrenheit.  
 Run-off was calculated from Dec. 1866 to Dec. 1872 and from Dec. 1874 to Dec. 1906 for these years the average run-off equals 53% of the precipitation.  
 Mean maximum high water = 15,800 cub. ft. per second for 60 years.

To accompany report upon survey with plans and estimates of cost for a navigable waterway 22 feet deep from Georgian Bay to Montreal

A. ST. LAURENT, BRUNSWICK  
 Engineer in Charge  
 J. R. DOUGLAS, CHIEF ENGINEER  
 S. C. CHAPMAN, BRUNSWICK  
 Chief Engineer

PLATE No. 30



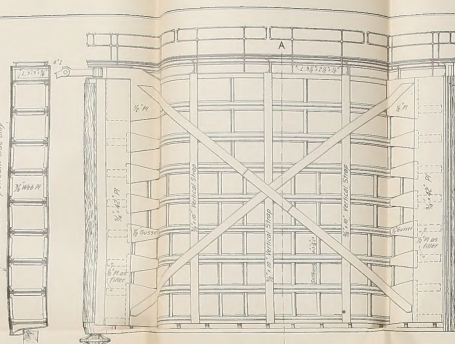


Public Works Canada  
Georgian Bay Ship Canal  
**TYPE OF UPPER LOCK GATE**

1. Secondary report on survey of plans and estimates of the Georgian Bay Ship Canal  
By H. M. D. R.

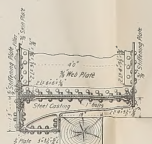
- 2. 1/2" Section of the Lock Gate
- 3. 1/2" Section of the Lock Gate
- 4. 1/2" Section of the Lock Gate
- 5. 1/2" Section of the Lock Gate

Steel Plate on upstream side only



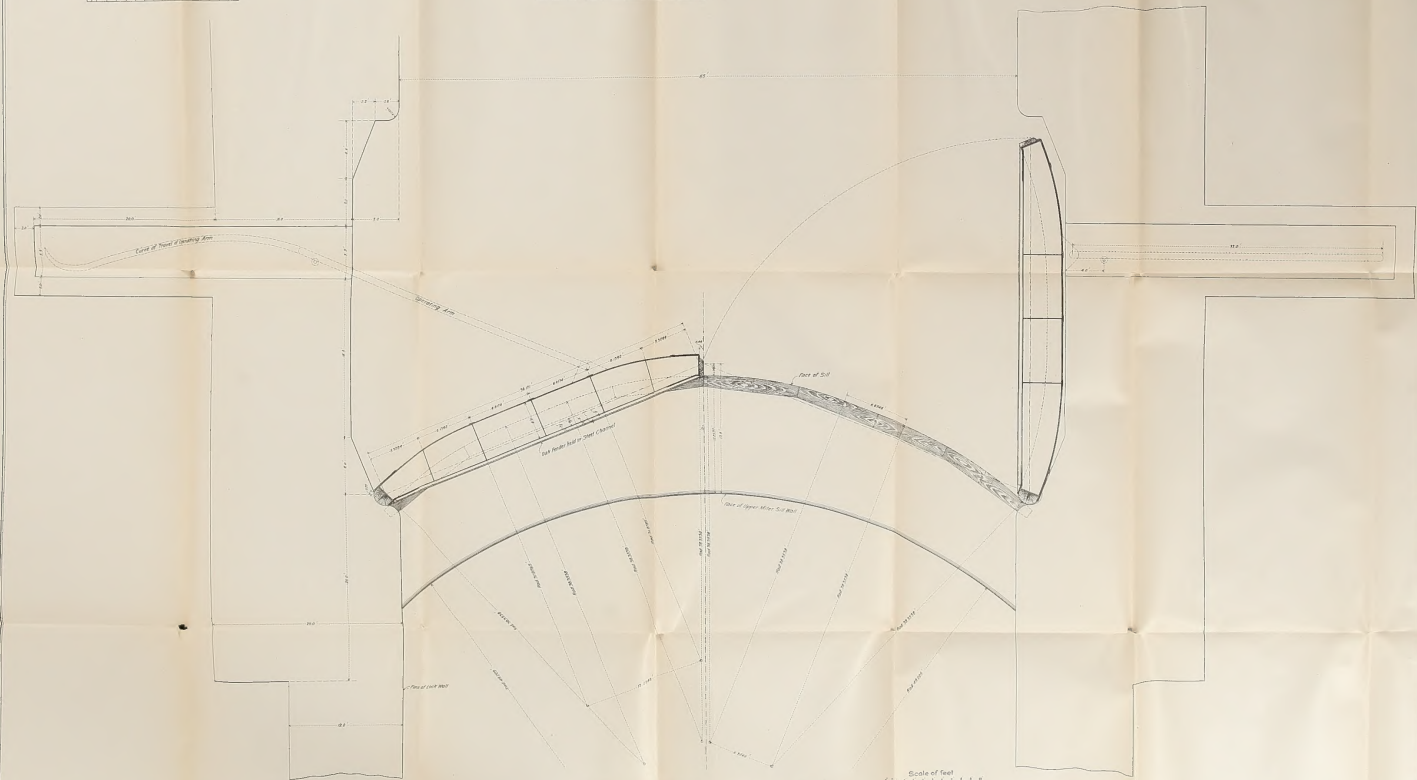
Section on A-A Downstream Elevation

Scale of feet  
0 1 2 3 4 5 6 7 8 9 10



Section of Shoe

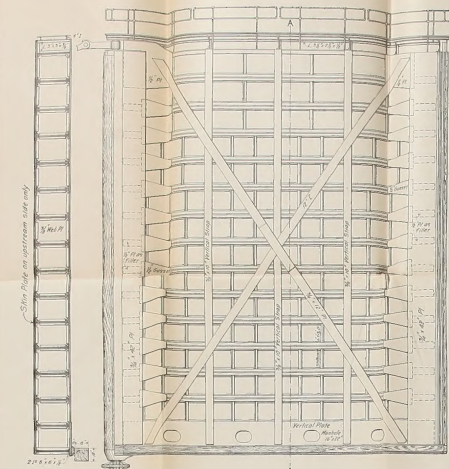
Scale of feet  
0 1 2 3 4 5



General Plan of Upper Sills, Quoins & Gate Recesses

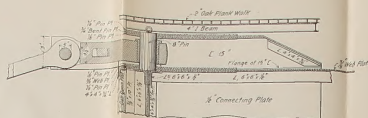
Scale of feet  
0 1 2 3 4 5 6 7 8 9 10



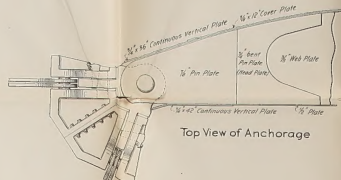


Section A-A Downstream Elevation

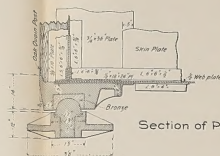
Scale of feet  
0 1 2 3 4 5 6 7 8 9 10



Section of Anchorage



Top View of Anchorage



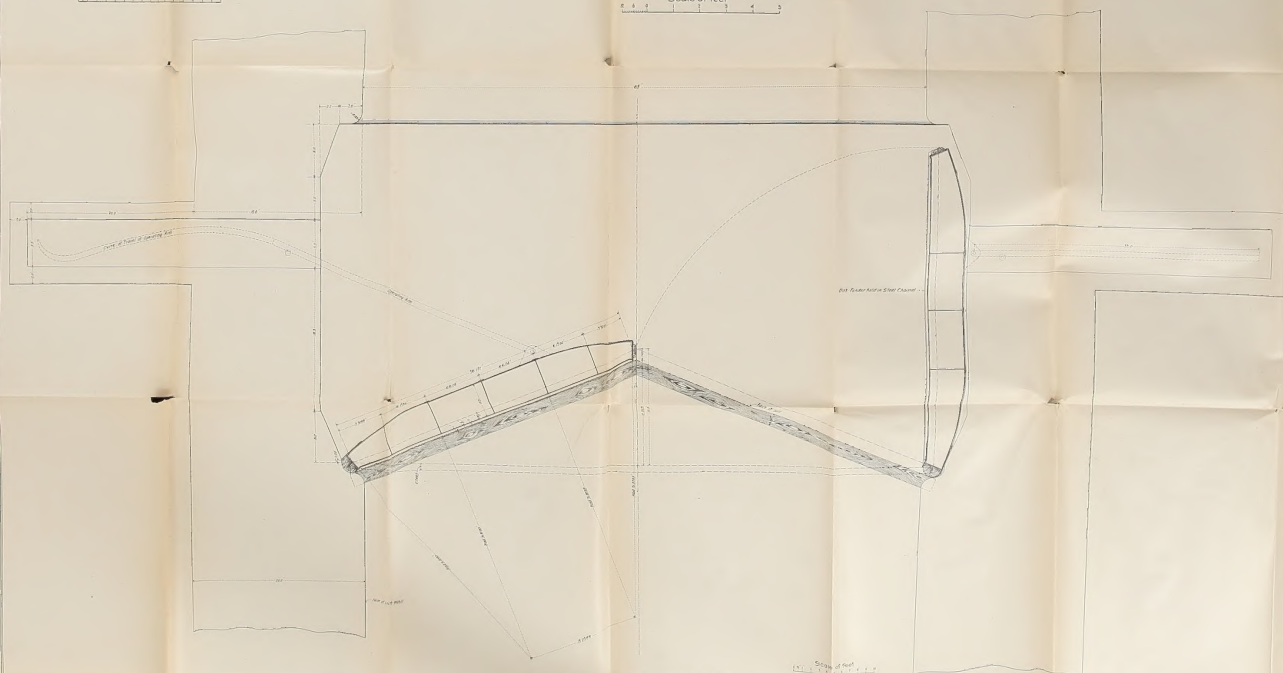
Section of Pivot

Scale of feet  
0 1 2 3 4 5

Public Works Canada  
Georgian Bay Ship Canal  
**TYPE OF LOWER LOCK GATE**

Y. L. & S. Co. Ltd. designed and constructed  
the gate for the Georgian Bay Ship Canal  
at Sarnia, Ont.

Y. L. & S. Co. Ltd.  
Sarnia, Ont.  
Y. L. & S. Co. Ltd.  
Sarnia, Ont.  
Y. L. & S. Co. Ltd.  
Sarnia, Ont.



General Plan of Lower Sills, Quoins & Gate Recesses

Scale of feet  
0 1 2 3 4 5 6 7 8 9 10



